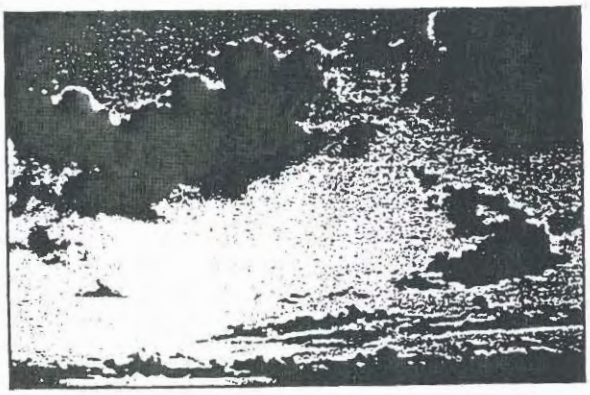
EXPLORING THE FRONTIER OF THE FUTURE

How Kentucky will live, learn and work



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THE KENTUCKY LONG-TERM POLICY RESEARCH CENTER

The Earnings of Dropouts and High School Enrollments: Evidence from the Coal Boom and Bust

The coal boom of the 1970s may have had an unanticipated outcome in Pike County, creating high-wage, relatively low-skill jobs in the local economy that effectively rewarded dropping out of high school. The implications are significant for an economy that has continued to produce incentives for college graduation, while providing little incentive to complete high school. These findings underscore the importance of linking economic reward to academic achievement. Earnings opportunities for high school graduates can be improved through better academic preparation for the workplace of today.

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Economic theory suggests that when students make the decision to drop out of high school they consider how their decision will affect their earnings. Thus, economists would expect that, if the reduction in earnings from dropping out of school is minimal, dropout rates will be high. As the loss of earnings for dropouts grows, however, the dropout rate should decrease. This paper summarizes an attempt to see if these predicted effects actually occur by looking at changes observed in dropout rates in some areas of Kentucky in the 1970s and 1980s.

The 1973 OPEC oil embargo caused a huge increase in the price of coal which, in turn, greatly expanded the demand for workers in the coal industry. Because many of the jobs in the coal industry require little in the way of formal schooling, this sudden change greatly affected the relative earnings of high school graduates and dropouts in a very short time.

Due to the oil embargo, Kentucky areas with coal experienced rising employment and earnings while other areas within relatively short distances suffered the declines in economic activity experienced by the overall economy as energy prices soared. As the oil prices declined, the demand for coal also declined, causing a subsequent bust in the coal market in the 1980s. This reversed the gains in employment and earnings experienced in the coal-producing regions during the 1970s.

The increases in coal prices in the 1970s were large by any standard. The real price of coal increased 44 percent between July 1973 and July 1974, and then remained relatively stable until about 1978, when it began a gradual decline through the 1980s and 1990s. The large upswing in coal prices had a major impact on Kentucky's economy. In 1972, mining earnings accounted for only 4.2 percent of the earnings of all Kentuckians, but by 1980 mining accounted for 9.4 percent of earnings. The economic benefits of the coal boom, however, were not spread evenly across the Commonwealth. Only 52 of Kentucky's 120 counties have coal reserves and, among those with reserves, there is great variation in the amount. Unfortunately for Kentucky, the coal bust that followed was equally sharp. Between 1982 and 1992, there was an 82 percent reduction in the number of coal miners in Kentucky.[1]

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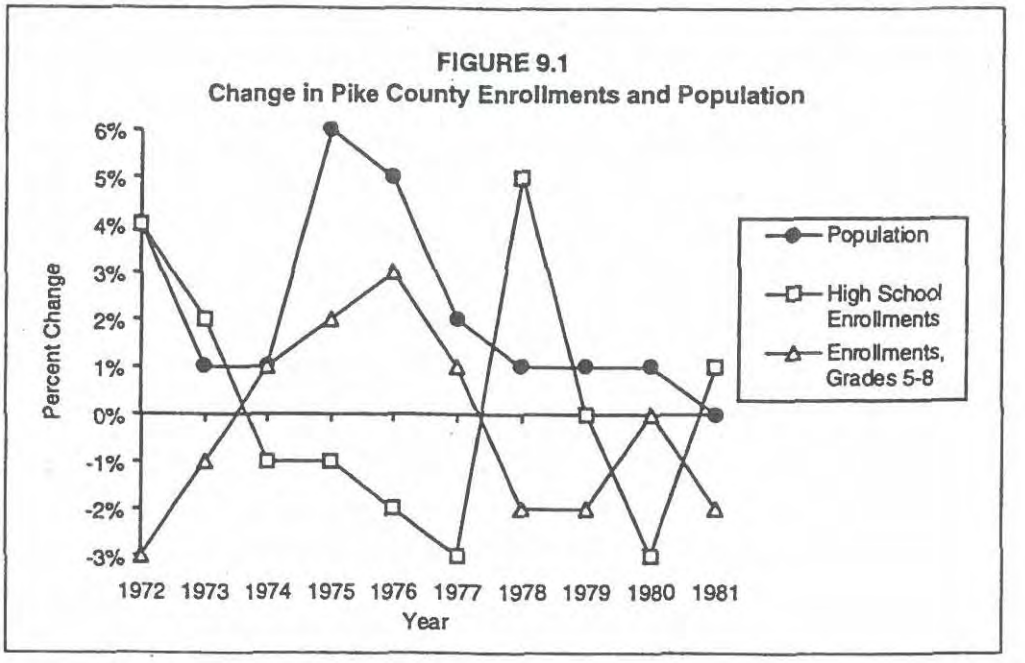
[1] Kentucky Coal Marketing and Export Council, Cabinet for Economic Development, and Kentucky Coal Association. *Kentucky Coal Facts 1993.*



As earnings in the coal industry fluctuated, so did high school enrollments in counties providing mining labor. Figure 9.1 provides a clearer view of the impact of the coal boom on high school enrollments. It depicts the rates of change between 1972 and 1982 in high school enrollments, enrollments in grades 5 through 8, and in population, for Pike County, Kentucky. Pike County is the largest coal-producing county in eastern Kentucky, with a population of 72.5 thousand people in the 1990 Census. Two features of the graph stand out. First, the change in population and the change in pre-high school enrollment track one another reasonably well. Second, the change in high school enrollments almost always moves in the opposite direction of changes in population: As population increased, high school enrollments decreased, and vise versa. This strongly suggests more and more students were not completing high school during the coal boom, but were dropping out to take jobs in the coal, and other industries, that were expanding at the time. The coal industry does not generally require its workers to have much formal schooling. As a result, the coal shock increased the earnings of high school dropouts relative to high school graduates, which caused a decline in high school enrollments.

Further evidence comes from estimating the effect of changes in earnings on changes in high school enrollment. Changes in earnings were estimated using data from the Bureau of Economic Analysis' (BEA) Regional Economic Information System for 1969 through 1993. Enrollment data was taken from various sources within the Department of Education. The estimate made with this data indicates that a 10 percent increase in earnings within a county reduces high school enrollments by about 2.5 percent. Thus, high school enrollments seem fairly sensitive to the opportunities for unschooled workers in the surrounding area.

If the coal boom reduced the incentive for some students to finish high school, then the coal bust in the 1980s should have increased the incentive to finish. Data from the Current Population Survey shows that, during the 1980s, there was a fundamental shift in the distribution of earnings in the United States. Workers who had relatively more education received much higher real wages, while workers with relatively little education saw large reductions in their real wages. It seems reasonable to expect that the large change in relative earnings affected the incentives students had to attend school.

TABLE 9.1
Relative Earnings of Kentucky Males Aged 25 to 55
Current Population Surveys, 1980 and 1990

	1980	1990
Earnings of those who did not attend high school relative to high school graduate	-27.8 %	-33.8 %
Earnings of high school dropouts relative to high school graduated	-17.3	-15.9
Earnings of those who attended, but did not graduate, from college relative to high school graduates	14.6	12.3
Earnings of college graduates relative to high school graduates	32.2	59.5
Earnings of graduate degree recipients relative to high school graduates	22.5	63.7

Notes: Data from the National Bureau of Economic Research's outgoing rotation CD. Estimates are from a regression that includes controls for race, marital status, potential experience, and time of interview. There are 1800 observations.

Estimates for Kentucky males between the ages of 25 and 55, given in the first column of Table 9.1, indicate that, in 1980, high school dropouts earned about 17 percent less than those who completed high school. Those who completed college earned about 32 percent more than high school graduates. The results for 1990, in the second column of Table 9.1, show a remarkable change. By 1990, those who completed college earned nearly 60 percent more than those who completed high school. Thus, Kentucky seems to have exhibited much the same patterns of earnings as the United States as a whole.

The results in Table 9.1 also indicate that wages of dropouts relative to high school graduates did not change much over the decade. While in 1980 dropouts earned 17 percent less than those who completed high school, they earned only 16 percent less than high school graduates in 1990, although this difference is not statistically significant. Thus, the 1980s provided little change in the incentive to complete high school. The wages of high school graduates declined in the 1970s and 1980s while the earnings of college graduates have increased.[2] Thus, the incentives to attend college have increased, but not the incentive to complete high school.

Implications for the Future

The change in relative earnings during the 1980s appears to be continuing in the 1990s. Many of the jobs in the past, such as farming and mining, required little in the way of formal education. As Kentucky's economy changes, however, its labor market is reacting. Several industries are growing as we move from our traditional agricultural economy, to one more concentrated in manufacturing and service. Jobs in the manufacturing and service industries generally require more formal education. Growth in these industries increases the returns to finishing high school and to pursuing higher education. As employers demand workers with greater skills, Kentucky should see reductions in the dropout rate. In addition, more students will pursue higher education. The Bureau of Economic Analysis estimates past—and projects future—employment and earnings by industry. These estimates appear in Tables 9.2 and 9.3. As the estimates show, the structure of Kentucky's economy and, therefore, the needs of its employers, are changing.

[2] See Katz, L.F., Murphy, K.M. (1992, February). Changes in relative wages 1963-1987: Supply and demand factors. *Quarterly Journal of Economics, 107*, 35-78.

TABLE 9.2
Number of Jobs by Industry in Kentucky (in Thousands)

	1989	1990	1991	1992	1993	1998	2000	2005
Farm	127	125	119	122	119	118	117	115
Agricultural Services	17	19	19	19	19	23	24	27
Coal Mining	31	32	29	26	25	-	19	17
Other Mining	8	8	7	7	7	27	7	6
Construction	99	101	99	106	110	119	120	125
Manufacturing	291	295	289	293	303	312	314	217
Transport & Utilities	91	96	97	97	100	107	109	115
Wholesale & Retail	397	404	405	415	427	462	469	491
F.I.R.E.	95	97	98	97	98	103	107	111
Services	410	436	447	463	481	546	571	625
Government	298	301	306	317	316	331	335	345
All-Industry Total	1863	1913	1916	1961	2003	2146	2191	2295

Note: The numbers above represent the number of full and part time jobs rather than the number of people. An individual who works two jobs will be counted for each job.
Source: Bureau of Economic Analysis Regional Projections to 2045: Volume 1, States.

TABLE 9.3
Average Annual Earnings by Industry in Kentucky (in Dollars)

	1989	1990	1991	1992	1993	1998	2000	2005
Farm	7,372	7,022	7,363	8,342	7,483	8,403	9,142	9,852
Agricultural Services	10,706	10,389	10,591	10,765	10,764	11,342	11,496	12,074
Coal Mining	38,684	38,491	38,425	39,307	39,130	-	-	-
Other Mining	33,655	33,736	33,374	34,307	34,112	36,018	35,969	37,303
Construction	18,914	18,300	17,412	17,359	17,642	18,352	18,483	18,934
Manufacturing	25,646	25,600	25,212	26,098	25,743	27,231	27,500	28,798
Transport & Utilities	25,404	24,981	25,126	26,056	25,721	26,212	26,126	26,660
Wholesale & Retail	12,978	12,759	12,757	12,891	12,861	13,220	13,253	13,515
F.I.R.E.	15,435	15,260	15,081	16,601	17,503	18,885	19,731	21,194
Services	15,431	15,283	15,341	15,847	15,192	16,687	17,066	17,862
Government	18,873	19,026	19,567	19.934	19,777	20,558	20,905	21,635
Average Annual Earnings for State	17,510	17,360	17,339	17,834	17,754	18,476	18,725	19,400

Note: The numbers above represent the number of full and part time jobs rather than the number of people. An individual who works two jobs will be counted for each job.
Source: Bureau of Economic Analysis Regional Projections to 2045: Volume 1, States.

Mining has traditionally been a high paying industry in Kentucky. In 1993, coal miners were paid an average of $39,000 per year. Over the past few years, however, both wages and employment in the mining sector have decreased. This trend is expected to continue into the future, assuming no shocks to the economy occur that would raise the price of coal.

From 1989 to 1993, services and wholesale and retail trade have shown relatively large growth in employment. Annual earnings in these sectors have seen little growth over the same time period. While little growth is expected in earnings per employee, the number of workers employed in these industries are expected to continue to grow. Currently, services account for approximately 24 percent of the jobs in Kentucky. It is projected that the service sector will grow to account for 26 percent of Kentucky jobs by the year 2000.

Manufacturing accounts for approximately 15 percent of Kentucky jobs. Projections show that growth in manufacturing should be enough to maintain its share of Kentucky jobs. Manufacturing jobs are relatively high paying jobs, averaging just under $26,000 per year.

Other industries, such as construction, transportation, utilities, and finance, will continue to show moderate growth. Farm employment has fluctuated in past years with a general downward trend that is likely to continue into the future.

Earnings available in the job market appear to play a significant role in determining the amount of education people desire. Historically, when coal jobs paid high wages, many students in the local area dropped out of school. The benefits to graduation were not high enough to keep those students in school. The Kentucky economy, however, appears to be moving to industries and jobs that require higher levels of education. As these jobs comprise a larger share of available employment opportunities, students will find greater rewards from educational attainment.

Conclusions

Obviously, most policymakers would prefer students to stay in school. Analysis suggests that the earnings of high school graduates relative to high school dropouts are of fundamental importance in determining the student's decision about whether to drop out. With the coal boom of the 1970s, as increased value of coal increased the wages of coal miners and mining jobs were plentiful, there was a reduction in the number of students enrolling in high school in the regions with coal to mine. As the coal industry then did not generally require workers with much formal schooling, these higher wages provided an incentive to drop out of high school. This reduction in high school enrollments occurred despite rapid population growth in the areas of Kentucky with coal reserves.

In 1990, Kentucky began a major education reform initiative: The Kentucky Educational Reform Act (KERA). The analysis has two important, but related, implications for KERA. First, it is important to recognize that general economic conditions affect the decision to complete high school. Thus, KERA could be remarkably successful, but high school enrollments could decline if the earnings opportunities for high school graduates continue to decline as they have since the middle of the 1970s. Second, if KERA is going to succeed in reducing the number of dropouts in Kentucky, it is important that there be an improvement in the skills of high school students not attending college. As employment opportunities change, the Kentucky secondary school system must provide high school graduates with the skills future employers will require.

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KENTUCKY OCCUPATIONAL OUTLOOK TO 2005

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February 1997

HIGHLIGHTS

- The Kentucky economy is expected to create more than 300,000 new jobs from 1994 through 2005. An additional 428,000 job vacancies in Kentucky will likely occur as workers leave or separate from various occupations. Such job vacancies become available through retirements, promotions or transfers within occupations.

- Kentucky jobs are expected to grow about 17 percent from 1994 through 2005. The nation is expected to grow about 14 percent in jobs over this period.

- Employment will grow in occupations requiring all levels of education and training. The contradictory beliefs that all growing occupations require little education or all require high levels of training are both incorrect. In truth, jobs requiring greater education and training clearly dominate those occupations that are growing the fastest and also have the highest pay rates.

- Employment in occupations requiring education and training beyond high school will increase in the share of total employment between 1994 and 2005. Those occupations which do not require additional education or training beyond high school will decline in total share.

- Education will continue to be most critical to one's success in the workplace of the future.

- Executive, administrative and managerial employment in Kentucky is projected to grow approximately 20 percent from 1994 through 2005, slightly outpacing the nation's growth rate.

- Professional, paraprofessional, and technical occupations as a group is expected to grow approximately 25 percent over the 1994-2005 period. This growth rate is slightly less than the growth in service occupations making it the second fastest-growing sector in the state.

- Professional, paraprofessional, and technical occupations as a group, however, will have more new job openings through 2005 than any other major group of occupations.

- Health occupations will increase by nearly 42,000 jobs over the 1994-2005 period, in part because of the need to care for aging Kentuckians with a longer life expectancy.

- Employment in computer, mathematical and related occupations will grow the fastest of all occupational groups in Kentucky through 2005.

- There were approximately 88,000 teachers, librarians and counselors in Kentucky in 1994. They represent almost 30 percent of the employment in professional, paraprofessional and technical occupations and over 5 percent of total Kentucky employment. Because of the large number of teaching jobs in Kentucky this group of occupations will provide the most job openings of any of the professional, paraprofessional and technical group of occupations.

- Marketing and sales occupations as a group is expected to grow rapidly between 1994 and 2005, with securities and financial services, sales and travel agents leading the growth.

- Administrative support occupations, including clerical, as a group is likely to grow about 10 percent through 2005, the slowest of the major occupational divisions. Technological advances in office procedures will likely slow the growth in these fields.

- Service occupations will grow the fastest of any group averaging about 26 percent over the 1994-2005 period with health service workers and protective service workers growing rapidly.

- Generally, agriculture, forestry, fishing and related occupations will likely continue its decline over the 1994 to 2005 period but at a slower pace. Farmers and farm workers, excluding agricultural services, account for almost all of the decline. Increased mechanization, rising cost of farming and the trends toward larger, more efficient farms are all factors contributing to their decline.

- Precision production, craft and repair occupations are expected to grow slowly over the projected period; however, in Kentucky this major group of jobs is expected to increase at twice the national growth rate.

- Mechanics, installers and repairers as a group will grow the fastest within the major division of precision production, craft and repair occupations.

- The largest occupational division in Kentucky is the operatives, fabricators and laborers with 341,730 workers employed in 1994.

- Operatives, fabricators and laborers will grow slowly from 1994 to 2005. Still, in Kentucky this major division of occupations is projected to grow at nearly three times the national rate.

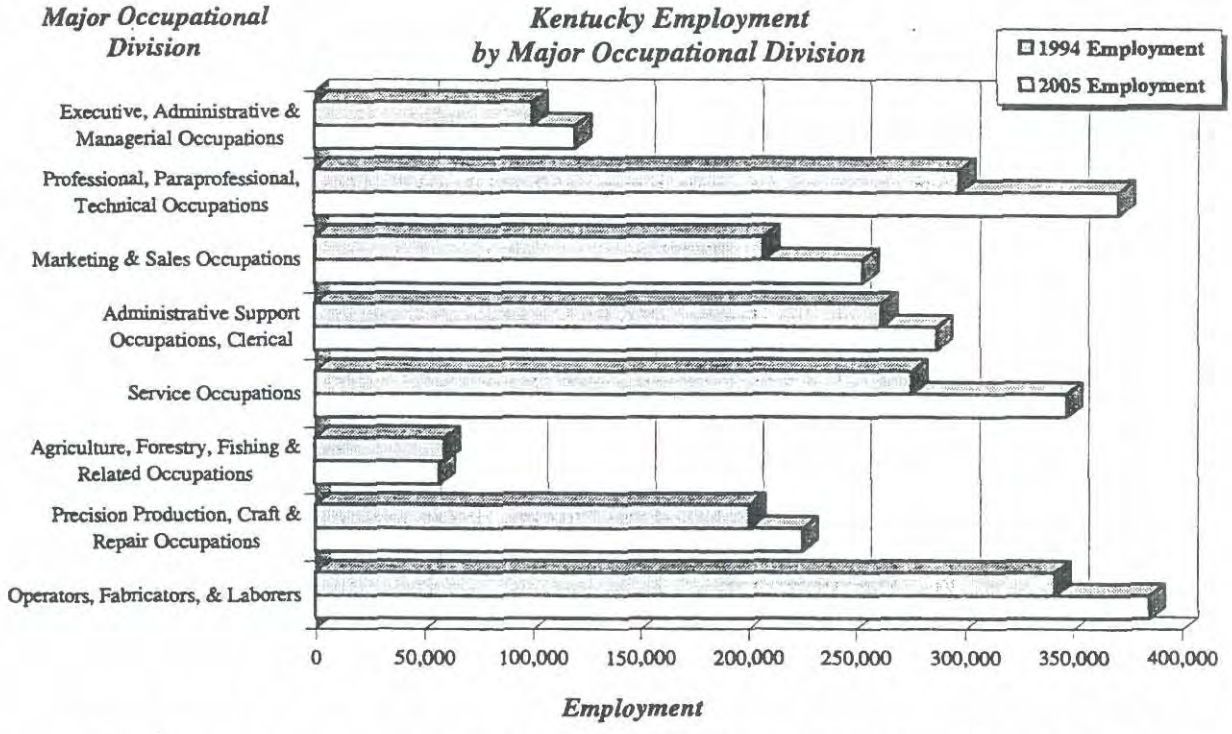
KENTUCKY OCCUPATIONAL OUTLOOK TO 2005

The future is never certain but it can be very useful to look ahead and try to determine the likely employment outlook for the Kentucky economy through the year 2005. Labor market conditions in Kentucky have been favorable for employment in recent years, and the job outlook projects a continuation of that trend.

The Kentucky economy is expected to grow about 17 percent and create over 300,000 new jobs from 1994 through 2005. An additional 428,000 job vacancies will likely occur as workers leave or separate from various occupations in Kentucky. Such job vacancies become available from retirements, promotions or transfers within occupations. This means the Kentucky economy will generate over 66,000 jobs per year through 2005 which will have to be filled by newly educated and trained workers.

The 1994 through 2005 employment change will vary greatly among the 620 occupations presented in the Kentucky Occupational Outlook and Job Openings table on pages 19-39. Kentucky's employment structure, therefore, will change considerably through the year 2005. The structure of the major occupational divisions, however, will change moderately from 1994 to 2005 (see chart 1).

CHART 1



Source: Kentucky Workforce Development Cabinet, Department for Employment Services, Research and Statistics Branch.

Nearly fifty percent of the new jobs created from 1994 through 2005 will be in two major occupational divisions: professional, paraprofessional and technical; and services. Employment in professional, paraprofessional, and technical occupations overall will grow about 25 percent and service occupations about 26 percent from 1994 to 2005. The professional, paraprofessional and technical occupations will produce the most new jobs of all sectors. New service jobs will rank second. Within these two major sectors, health care and computer-related occupations will grow very rapidly through 2005. New jobs in personal service and protective service occupations will also increase at a very fast pace.

Marketing and sales; as well as executive, administrative and managerial occupations overall will grow faster than the average rate through 2005. Job growth in both major occupational divisions in Kentucky is projected to outpace the nation through 2005. Marketing and sales occupations will average about 22 percent growth from 1994 through 2005 in Kentucky; the nation is expected to grow 18 percent. The Kentucky rate of growth in executive, administrative and managerial occupations will be about 20 percent while the national rate is about 17 percent from 1994 through 2005.

Jobs in administrative support occupations, including clerical, will grow at a slow 10 percent rate from 1994 through 2005. Advances in technology and office procedures will be responsible for the slow growth rate. Agriculture, forestry, fishing and related occupations as a major division is expected to continue its decline but at a reduced pace of less than four percent over the 1994 to 2005 period. Farmers and farm workers account for almost all of the decline in this major division. Increased mechanization, rising cost of farming and the trends toward larger, more efficient farms are all factors contributing to their decline.

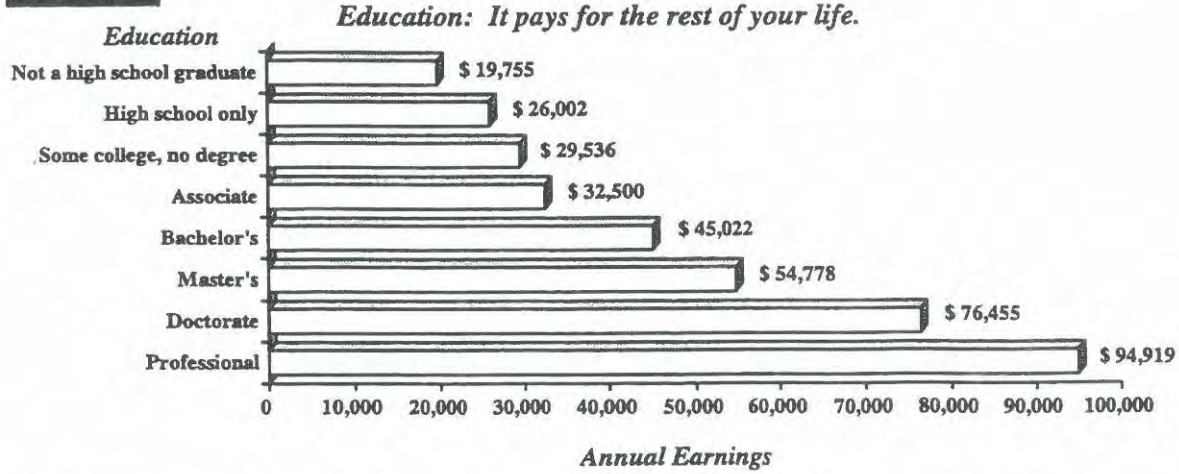
Precision production, craft and repair occupations; as well as operators, fabricators, and laborers will grow slowly over the projected period. Still, new jobs in precision production, craft and repair occupations in Kentucky are anticipated to increase at twice the national growth rate from 1994 through 2005. Operators, fabricators and laborers in Kentucky will grow nearly three times the national rate. These faster growth rates reflect the strength of Kentucky's manufacturing and construction industries which employ many of these workers.

EDUCATION AND EARNINGS

The types of jobs in the future workplace are determined by the market place, but education will continue to be most critical to one's success in the workplace of the future. The requirements in many of the lesser skilled jobs in the marketplace will remain unchanged. Their skill requirements are low and will remain so, however, the education and job requirements in many of the higher skilled jobs will expand and change significantly. The better educated and trained you become to meet these changes, the more job opportunities and higher pay your qualifications will generate.

Education pays the rest of your life. Traditionally, the more education you have, the more money you earn. In fact, the value of education has clearly increased during the past 20 years. Not every person who holds an advanced degree reports a high income and many people who have left school early have high earnings today. There is a clear relationship, however, between the amount of schooling and subsequent earnings (see chart 2).

CHART 2



Source: US Department of Commerce, Bureau of the Census, mean annual earnings for full-time workers age 18 and over by highest level of education, 1994.

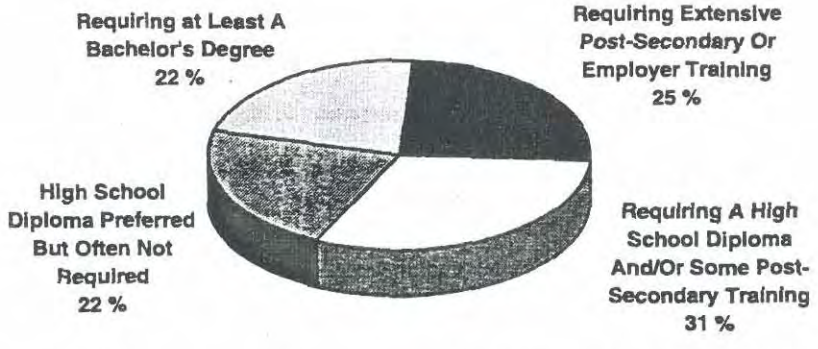
EDUCATION AND TRAINING

This study looks at occupations by levels of education and training generally required to gain employment in the field. The four broad educational requirements used to organize the occupations are as follows: bachelor's degree or more; extensive post-secondary (less than a bachelor's degree) and/or employer training; high school diploma and/or some post-secondary training; and high school diploma preferred but often not required.

Employment will grow in occupations requiring all levels of education and training. Kentucky's job growth through 2005 when allocated among the four education levels will range from 22 to 31 percent (see chart 3). Employment in occupations requiring education and training beyond high school will increase in the share of total employment between 1994 and 2005. Those occupations which do not require additional education or training beyond high school will decline in total share.

CHART 3

Percent of Total Kentucky Job Growth by Education or Training 1994-2005



Source: Kentucky Workforce Development Cabinet, Department for Employment Services, Research and Statistics Branch.

CHARTING THE OCCUPATIONAL OUTLOOK

The ten charts on the following pages focus on the occupations in Kentucky with the most annual job openings, fastest-growing employment and significant employment decline from 1994 through 2005.

Each chart ranks the top 25 occupations, from highest to lowest, according to the number of annual job openings or employment change expressed as a percentage. In addition, comments beside the charts explain some of the occupational employment changes and factors affecting these changes.

The first eight charts organize the occupations by the levels of education outlined above. Charts 4 and 5 present Kentucky occupations which usually require at least a bachelor's degree. Charts 6 and 7 display Kentucky occupations which require extensive post-secondary and/or employer training. Charts 8 and 9 present Kentucky occupations which require a high school diploma and/or some post-secondary education. Kentucky occupations for which a high school diploma is preferred but often not required are shown in Charts 10 and 11.

The last two, Charts 12 and 13, identify Kentucky occupations for which employment is declining significantly.

CHART 12

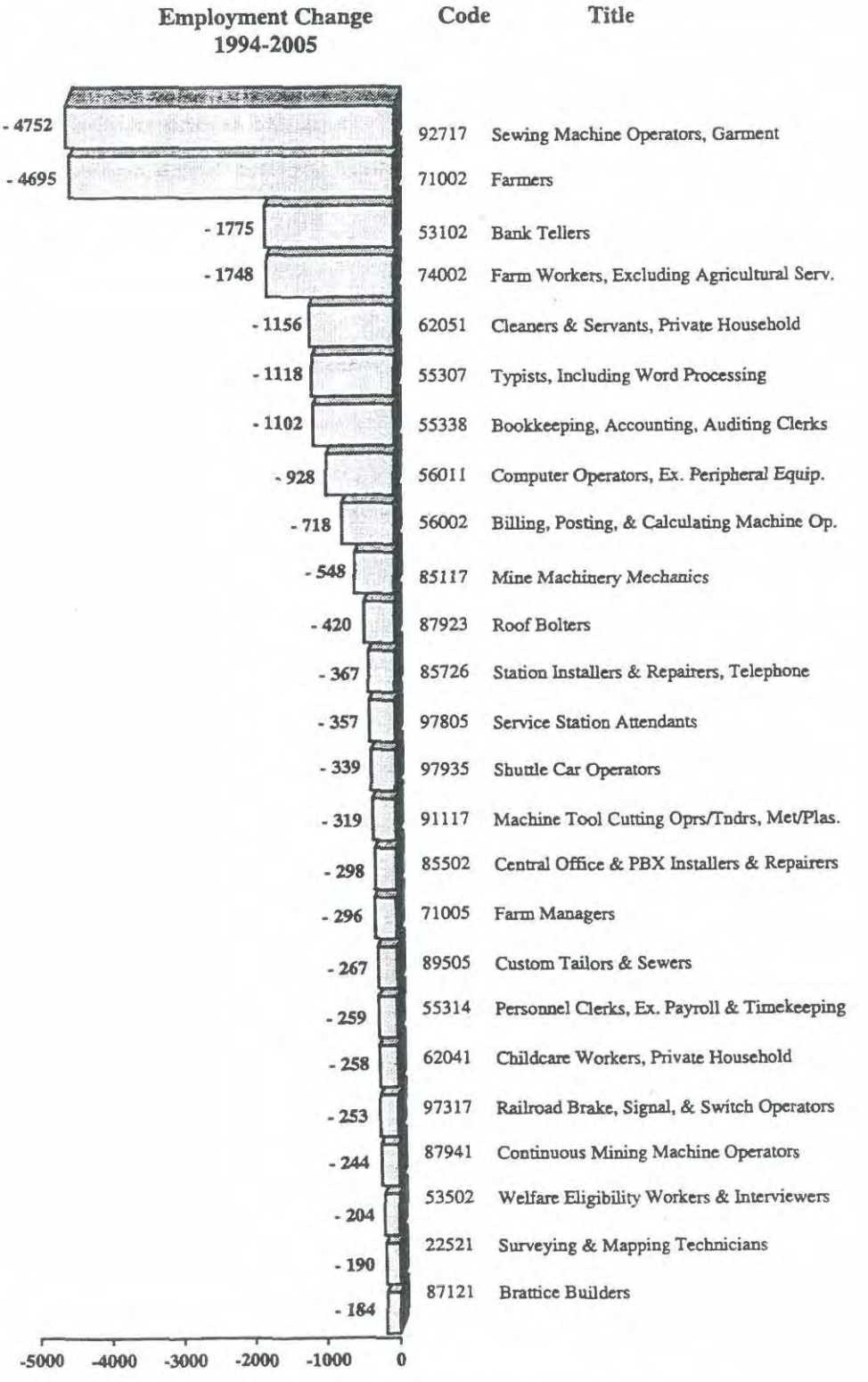
Twenty-Five Kentucky Occupations Losing The Largest Number Of Jobs, 1994 To 2005

Declining employment is generally a sign that the occupation does not have a favorable job outlook. The number of workers who leave or separate from an occupation, however, is generally larger than the declines in employment. Some positions, therefore, do become available to job seekers.

Automation as well as changes in technology or the demand for products/services are some reasons that may explain why an occupation is declining in employment.

Bank tellers, for example, are projected to decline because new technology is expected to automate banking transactions. Advances in office automation will also have a significant effect on many administrative support and clerical occupations.

Several of the occupations in this chart are in Kentucky's farming and mining industries where fewer workers are producing more.



Source: Kentucky Workforce Development Cabinet, Department for Employment Services, Research & Statistics Branch.

Adult Literacy in Kentucky

ADULT EDUCATION  CHANGING LIVES

Kentucky Department for Adult Education and Literacy
Cabinet for Workforce Development

A Report on the
Kentucky Adult Literacy Survey

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February 1997

Executive Summary

The Kentucky Department for Adult Education and Literacy, Cabinet for Workforce Development, commissioned the Kentucky Adult Literacy Survey to obtain accurate information about literacy levels of Kentucky's adult population. The survey was designed to determine literacy levels, provide information about their distribution in the population, and analyze the determinants and consequences of literacy. Information from the survey will be used to plan programs to improve the literacy levels of the population and foster the economic development of the Commonwealth.

The literacy survey provides information about

- literacy proficiencies of the population,
- the characteristics of those who lack literacy skills, and
- the distribution of literacy problems around the state.

This information will facilitate decision making about

- the level of funding required to raise the literacy levels of the population,
- segments of the population to target for services, and
- how to allocate funding to produce the greatest impact.

Support for these literacy development activities will

- allow citizens to improve their economic well-being,
- enhance Kentucky's appeal to enterprises seeking a highly skilled workforce,
- foster higher levels of active citizenship, and
- enable more Kentucky parents to properly support the education of their children.

The Meaning of Literacy

The Kentucky Adult Literacy Survey is based on the National Adult Literacy Survey (NALS). Both surveys used this definition of literacy, which recognizes that literacy has several dimensions and varies in degree:

> *Using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential.*

The literacy instrument employed in the study captures three dimensions of literacy: prose, document, and quantitative. Prose literacy involves the knowledge and skill to understand and use information that is contained in prose format, such as news stories, reports, books, and poems. Document literacy is the knowledge and skill to find and use information in documents like job applications, maps, schedules, and payroll forms. Quantitative literacy is the knowledge and skill to locate numbers contained in printed material and apply arithmetic operations either alone or sequentially to do things like balance a check book, complete an order form, figure the interest from a loan application, or similar activities.

Literacy is not an either/or proposition. People possess it in varying degrees, and the degree of an individual's literacy proficiency can change over time. Recognizing this, the Kentucky Adult Literacy Survey recognizes five general levels of literacy proficiency along each of the dimensions: prose, document, and quantitative.

Individuals at Level 1 have no or minimal literacy skills. They may not be able to read at all or they may be able to locate only a single piece of information in a simple text. As the complexity of tasks that the individual can complete increases, so does the level of literacy. At Level 5, the highest level of literacy proficiency, individuals are able to extract and use complex information for various purposes.

The Literacy Survey

The Martin School of Public Policy and Administration at the University of Kentucky completed interviews with 1,492 citizens of Kentucky between the ages of 16 and 65 to determine literacy levels in the state. The respondents were selected through a

random sample stratified by region to produce a statewide sample drawn from five geographic regions of the state: Northern Kentucky, the Bluegrass region, Eastern Kentucky, the Louisville area, and Western Kentucky. The interviews were conducted by trained interviewers in the subjects' homes. The interviews lasted an hour each, on average. Each subject was asked to complete a literacy skills assessment instrument and respond to a series of questions about background characteristics.

The Kentucky Adult Literacy Survey provides useful information about the literacy skills of Kentucky's adult population. The survey provides detailed information about the literacy levels of the population and the distribution of literacy skills among population groups and across the state.

The Kentucky Adult Literacy Survey (KALS) is based on the same instruments that were used to measure literacy across the United States in the National Adult Literacy Survey. The instruments measure literacy along three dimensions: prose, document, and quantitative. The data were prepared by Educational Testing Service and analyzed by the Martin School.

The survey provides average literacy proficiencies along the three dimensions for the adult population, as well as for subgroups of the population. It also tells us what percentage of Kentuckians perform at each of five levels of literacy proficiency. Scores on the three dimensions range from 0 to 500. Level 1 encompasses scores from 0 to 225; Level 2 is 226 to 275; Level 3 is 276 to 325; Level 4 is 326 to 375; and Level 5 is 376 to 500.

The Literacy Skills of Kentucky Adults

What do the numbers tell us? First of all, they tell us that the average literacy levels of Kentucky's population are competitive with literacy levels of all Americans and of residents of the Southeast United States.

According to the Kentucky Adult Literacy Survey and the National Adult Literacy Survey (which measured the Southeast as well as the nation), the average prose proficiency of Kentucky adults is 286, compared to 267 for the Southeast and 272 for the nation. The average document proficiency in Kentucky is 284, compared to 262 in the

Southeast and 267 in the nation. The average quantitative literacy proficiency is 280 in Kentucky, 265 in the Southeast, and 271 for the country as a whole.

This translates into more Kentuckians performing at high levels of proficiency compared to adults in the Southeast or the nation. Fifty-nine percent of Kentuckians perform at the three highest levels of prose proficiency, compared with 48 percent in the Southeast and 52 percent nationwide. Fifty-eight percent of Kentuckians perform at the three highest levels of document proficiency, compared to 45 percent in the Southeast and 49 percent nationwide. And 56 percent of Kentuckians score at the three highest levels in quantitative proficiency, compared to 48 percent in the Southeast and 52 percent nationwide.

Part of the reason that average literacy levels in Kentucky as measured by the KALS exceed those of the nation and Southeast as measured by the NALS is that the national survey included senior citizens, while the Kentucky survey did not. Kentucky surveyed only those ages 16-64 because it wanted to focus its survey on the population generally considered to be working age.

When only the population ages 16-64 is examined, Kentucky's average literacy proficiencies still exceed national averages, but by smaller margins. In prose proficiency, the national average for people ages 16-64 is 280, while the Kentucky average is 286. In document proficiency, the national average for people ages 16-64 is 276, and the state average is 285. In quantitative proficiency, the national average for people ages 16-64 is 279, and the Kentucky average is 280.

The numbers found in the Kentucky Adult Literacy Survey generally should be good news to those whose job it is to promote Kentucky and its work force to employers around the globe. But the numbers also mean that Kentucky faces significant challenges.

For example, even though Kentucky's average literacy proficiency is higher than that of the Southeast and of the nation, 14 percent of Kentucky adults have a prose literacy proficiency at Level 1. Another 26 percent of Kentucky adults are at Level 2. For document literacy, 13 percent of Kentucky adults are at Level 1, and 29 percent at Level 2. And 16 percent of Kentucky adults have a quantitative literacy proficiency at Level I, with another 28 percent at Level 2.

Those numbers mean that about 14 percent of Kentucky adults on average have no or virtually no literacy skills. In other words, about 340,000 Kentuckians lack the minimal skills needed to function effectively in the marketplace, the workplace, the home and the community. Another 656,000 on average have low levels of skills that are likely to impede their personal advancement and the development of the state's economy.

Those numbers illustrate our challenges, and the Kentucky Adult Literacy Survey will help the Department for Adult Education and Literacy determine how best to meet those challenges. But it is encouraging to note that Kentucky has fewer residents performing at the lowest literacy levels than do the nation and the Southeast. For example, 14 percent of Kentuckians are at Level 1 of prose proficiency, compared to 23 percent in the Southeast and 21 percent nationally.

Just as literacy levels vary across the United States, they vary across the regions of Kentucky. Average proficiencies are highest in the Bluegrass region surrounding Lexington and lowest in Eastern Kentucky. Average prose proficiency, for example, is 303 in the Bluegrass and 264 in Eastern Kentucky. On that dimension, the Louisville area is at 294, Northern Kentucky is at 285, and Western Kentucky is at 282.

Educational Attainment, Parental Encouragement and Social Background

The survey reveals that literacy proficiencies are related to educational attainment, parental encouragement and social background.

The effect of education is dramatic. Average prose proficiency ranges from 185 for those with zero to eight years of schooling to 284 for those with a high school diploma to 345 for those with a four-year college degree or more.

Studying for and attaining a general equivalency degree (GED) makes a significant difference. High school dropouts who have not studied for the GED have an average prose proficiency of 201; those who studied for it but did not receive it have an average proficiency of 241; the average for those who have received the GED is 273.

Parental influences are significant. Individuals who were read to by their parents as children, who had their parents' help with homework, and whose parents met with their

teachers and were members of the parent-teacher organization have higher proficiency scores. Children who grew up in homes where there were newspapers, books, magazines, dictionaries, and encyclopedias have higher literacy proficiencies.

Blacks scored lower than whites on the Kentucky survey, just as blacks scored lower than whites on the national survey. The average prose proficiency of whites on the Kentucky survey is 289, compared to 238 for blacks.

Individuals with disabilities, whether physical or mental, have lower proficiency levels than those without disabilities.

There are no differences by gender in the Kentucky survey.

Literacy and Economic Well-Being

Literacy affects the economic well-being of Kentuckians. Individuals who have higher literacy levels experience less unemployment and are more likely to have full-time jobs. Literacy has a significant impact on wages. Kentucky adults who are at prose proficiency Level 1 have median weekly wages of $248, compared to $348 for those at Level 3 and $583 for those at Level 5.

Lower levels of literacy proficiency are associated with higher levels of poverty and welfare dependency. Sixty-five percent of Kentucky adults who are at prose proficiency Level 1 are poor or near poor as defined by the U.S. Census Bureau. This is true for 16 percent at Level 3 and 4 percent at Level 5. In a similar manner, 46 percent of those at prose Level 1 receive public assistance in the form of food stamps, welfare, or Supplemental Security Income. Thirteen percent of those at Level 3 receive public assistance, as do 1 percent of those at Level 5.

Social Involvement, Information Use, and Helping Children Learn

Literacy also affects social involvement, the ways people obtain information, and family relationships. For example, there is a strong relationship between literacy and voter participation. Forty-eight percent of those at prose proficiency Level 1 voted in the past five years, compared to 64 percent of those at Level 3 and 93 percent of those at Level 5.

Across a range of written materials, Kentucky adults with lower literacy

proficiencies make less use of most information resources: letters and memos, reports and articles, reference books, catalogs, directions, diagrams, spreadsheets, and forms. Those who read the newspaper frequently have higher scores than those who seldom or never read it. Those with higher scores read more magazines and books, and make greater use of libraries. They also watch less television.

Eight percent of Kentucky adults never or almost never read to their children under the age of 6. In addition, those with lower literacy levels are less likely to keep newspapers, magazines or books in the home. Thus, they run the risk of discouraging literacy development in their own children.

Literacy Levels in Kentucky

Average Proficiencies and the Distribution of Literacy

The story of literacy in Kentucky begins with a look at literacy proficiency levels. As can be seen in Figure 1, 14 percent of the 2.4 million adult Kentuckians have a prose literacy proficiency at Level 1. Another 26 percent are at Level 2. For document literacy, 13 percent are at Level 1 and 29 percent are at Level 2. And, 16 percent of adult Kentuckians have a quantitative literacy proficiency at Level 1 with another 28 percent at Level 2.

What do these numbers mean? They mean that 40 to 44 percent of the adult population have quite modest, minimal or no functional literacy skills. Those at Level 1, about 14 percent of Kentucky's adult population or 3406,000 people, have extremely limited to no literacy skills. The simplest prose literacy tasks at Level 1 involve reading a relatively short text to locate a single item of information identical to or synonymous with the information given in the question or directive. For example, one task involves reading a simple newspaper article and identifying the sentence containing a requested piece of information, such as the name of the pitcher who won the ball game. Fourteen percent of Kentucky adults perform at this level.

As noted in the National Adult Literacy Survey, prose literacy tasks at Level 2 make slightly greater demands on reading skills, requiring the reader to find a single piece of information in the text while ignoring distracters or plausible but incorrect information. Low-level inferences might be required, or the reader might be required to integrate two pieces of information or compare and contrast easily identifiable information. As an example, one task at the upper end of this level requires the reader to identify exactly what is wrong with an appliance by choosing the most appropriate of four statements describing what is wrong with it. Twenty-six percent of Kentuckians are at this level.

The average prose literacy proficiency in Kentucky is 286. This is at the lower end of Level 3, where 34 percent of Kentuckians are located. Another 25 percent are at either Level 4 or Level 5. Tasks at Prose Level 3 require the reader to make literal or synonymous matches between the text and information given in the task, or to make matches that require low level

inferences. The reader might be asked to integrate information from dense or lengthy text that contains no organizational aids such as headings. For example, one task at level 3 requires the reader to write a letter explaining that an error has been made on a credit card bill. In another example, the reader is required to read a magazine article about an Asian-American woman and identify what she did to help resolve conflicts due to discrimination.

Level 1 document literacy tasks require the reader to either locate a piece of information based on a literal match or enter information from personal knowledge onto a document. It might, for example, involve being able to read the instruction and sign one's name to a Social Security Card. As the National Adult Literacy Survey noted, "Tasks such as this are quite simple, since only one piece of information is required, it is known to the respondent, and there is only one logical place on the document where it may be entered." More complex tasks at this level would require the reader to provide several pieces of information, such as those called for in a section of a job application. Thirteen percent of Kentuckians are at this level.

Document literacy at Level 2 makes somewhat more difficult demands on the reader. It may require matching a single piece of information where distracters are present or where low-level inference is required. It may require integrating information from different parts of a document. One task at this level requires the reader to look at a pay stub and write the gross pay for this year to date. The stub contains both current pay and pay to date and both net pay and gross pay. Twenty-nine percent of adult Kentuckians are at this level.

The average document literacy of Kentucky adults is 284, which is at the lower end of Level 3. Thirty-six percent of Kentucky adults are at this level. Another 22 percent are at Levels 4 and 5. Document literacy at Level 3 involves integrating multiple pieces of information from one or more documents or cycling through rather complex tables or graphs containing information that is not relevant or appropriate to the task. In one example the reader is asked to use a stacked bar graph showing power consumption by source for four years to determine an energy source that will provide more power in the year 2000 than it did in 1971.